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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/726,821	12/02/2003	Kenji Fukui	14293-003001	4124
20985	7590	12/06/2005	EXAMINER	
FISH & RICHARDSON, PC P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022			DETSCHER, MARISSA	
			ART UNIT	PAPER NUMBER
			2877	

DATE MAILED: 12/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary

Application No.

10/726,821

Applicant(s)

FUKUI, KENJI

Examiner

Marissa J. Detschel

Art Unit

2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10-27 is/are allowed.
- 6) ☒ Claim(s) 1 and 4-7 is/are rejected.
- 7) ☒ Claim(s) 2,3,8 and 9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 12/2/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Priority

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. 2002-353520, filed on December 5, 2005 in Japan.

Information Disclosure Statement

The information disclosure statement filed on December 2, 2003, has been fully considered by the examiner.

Drawings

Figure 13 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: "Point Diffraction Interferometer with Enhanced Contrast" or the like.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 4-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nobutaka (JP 57-64139A) in view of Naulleau (USPN 6,266,147).

Nobutaka discloses an interferometer comprising

beam splitting means (8) for splitting an incident beam into first and second split beams,

and first lens (at 1),

a transparent substrate (7) arranged in an optical axis direction where the first and second focal spots (0 and 10) are formed providing a pinhole (12) whose central position is the central position of the second focal point (Abstract, lines 13-14),

a second lens (at 6) for converting a first divergent beam (W_1) diverged from the first focal spot into a first parallel beam and for converting a second divergent beam (W_2) diverged from the pinhole into a second parallel beam; and

an imaging device (at 6) for observing interference fringes produced by an optical interference between the first parallel beam and the second parallel beam (Abstract lines 16-18).

Nobutaka does not disclose the configuration with the first lens being arranged to converge the first and second split beams onto first and second focal spots respectively. It would have been obvious to one of ordinary skill in the art at the time the invention was made to place the first lens (at 1) after the beam splitting means (8) to converge the first and second split beams, since it has been held that rearranging parts of an invention involves only routine skill in the art. In re Japiske, 86 USPQ 70.

Furthermore, Nobutaka does not disclose an opaque zone being provided on the transparent substrate in the vicinity of the position where the second spot is formed, the opaque zone having a pinhole. Naulleau discloses the use of a mask (20) in an interferometer that blocks unwanted diffraction orders generated by a beam splitting means (8) and spatially filters out a beam using a pinhole (16). (column 2, lines 29-32) The ability of this mask to block unwanted diffraction orders exemplifies that it is opaque. Therefore, an opaque zone surrounds the pinhole. This setup allows light being sent through the pinhole to be of one desired diffraction order (column 2, lines 50-52) without any ambient light from the other orders that are blocked by the mask surface. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the pinhole surrounded by the opaque zone in the mask of Naulleau's interferometer to provide a clear wave of a desired diffraction order in order to create a more accurate measurement with increased signal-to-noise ratio.

Regarding claim 4, the beam splitting means of Nobutaka's device is a diffraction grating (8) (Abstract, lines 6-10).

In regards to claim 7, the first split beam (0) of Nobutaka's device is of zero order diffracted light by the diffraction grating (8) and the second split beam (10) is a first order diffracted light by the diffraction grating (8). (Abstract, lines 10-12)

Regarding claims 5 and 6, Naulleau provides diffraction gratings with staircase (Figure 3F) and sawtooth (Figure 3D and 3E) cross-sections in an interferometric device. These types of gratings diffract a zero order diffraction of light and a first order diffraction of light, the first order diffraction light being sent through the pinhole of the mask. (column 5, lines 5-10) It would be inherent to use diffraction gratings such as those in Naulleau's device to create the diffracted orders of light for measurement purposes in Nobutaka's device.

Allowable Subject Matter

Claims 10-27 are allowable over the prior art.

Claims 2, 3, 8, and 9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claim.

The following is a statement of reasons for the indication of allowable subject matter:

As to claims 2 and 3, the prior art of record, taken alone or in combination, fails to disclose or render obvious a point diffraction interferometer utilizing a transparent substrate with a disk-shaped opaque zone.

As to claim 8, the prior art of record, taken alone or in combination, fails to disclose or render obvious the use of a wedge-type prism as a beam-splitting means in a point diffraction interferometer.

As to claim 9, the prior art of record, taken alone or in combination, fails to disclose or render obvious a point diffraction interferometer that measures two split beams with an intensity ratio of the second split beam to the first split beam to be set within a range of 1.1 to 5.0.

As to claims 10-18, the prior art of record, taken alone or in combination, fails to disclose or render obvious an interferometer that utilizes a mirror with a reflective surface perpendicular to first and second split beams reflected by a beamsplitter, said mirror having a transparent zone with a micromirror at the center of the transparent zone.

As to claims 19-27, the prior art of record, taken alone or in combination, fails to disclose or render obvious an interferometer that utilizes a mirror with a reflective surface perpendicular to first and second split beams transmitted by a beamsplitter, said mirror having a transparent zone with a micromirror at the center of the transparent zone.

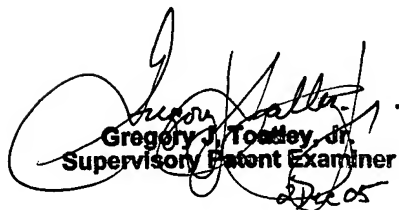
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marissa J. Detschel whose telephone number is 571-272-2716. The examiner can normally be reached on M-F 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr. can be reached on 571-272-2059. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Marissa J Detschel
November 30, 2005
MJD


Gregory J. Toatley, Jr.
Supervisory Patent Examiner
2/2/05